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(to be used for all correspondence after initial filing)

Application Number	10/044,268
Filing Date	01/08/02
First Named Inventor	Charles Leu
Art Unit	2872
Examiner Name	PRITCHETT JOSHUA
Total Number of Pages in This Submission: 52	Attorney Docket Number

ENCLOSURES *(Check all that apply)*

- [X] Fee Transmittal Form
- [X] Fee Attached
- [X] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
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  - [ ] Response to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
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- [ ] After Allowance communication to Group
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- [X] Appeal Communication to Group **(Appeal Notice, Brief, Reply Brief)** (3 copies)
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Remarks

The enclosed brief supports Notice of Appeal received by the office on Dec. 11, 2003 from which two months period is measured for submission of this brief.

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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Wei Te Chung Foxconn International, Inc.
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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 330.00

Complete if Known	
Application Number	10/044,268
Filing Date	01/08/02
First Named Inventor	Charles Leu
Examiner Name	PRITCHETT JOSHUA
Art Unit	2872
Attorney Docket No.	

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1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

	Extra Claims		Fee from below		Fee Paid
Total Claims		-20** =		X	=
Independent Claims		- 3** =		X	=
Multiple Dependent					=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

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FEE CALCULATION (continued)

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1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for *ex parte* reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

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SUBMITTED BY				(Complete *(if applicable)*)
Name (Print/Type)	Wei Te Chung	Registration No. (Attorney/Agent)	43,325	Telephone 408-919-6137
Signature				Date 2/6/04

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TABLE OF CONTENTS

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Leu et al.	)	Examiner: Joshua L Pritchett
Serial No: 10/044,268	)	Group Art Unit: 2872
Filed: 01/08/2002	)	Dated: Feb. 11, 2004
For: INDIUM-TIN OXIDE THIN FILM FILTER FOR DENSE WAVELENGTH DIVISION MULTIPLEXING	)	

CERTIFICATE OF MAILING

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Signed: Wei-Te Chung

APPEAL BRIEF

Assistant Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

On Dec. 8, 2003, the Appellant appealed from the final rejection of claims 1-3 and 7-14 contained in the Office action of Aug. 7, 2003. The following is the Appellant's Appeal Brief pursuant to 37 C.F.R. 1.192 *wherein the office receipt date of the notice of appeal is Dec. 11, 2003 according to the returned postcard and this Appeal Brief is filed within the required two months therefrom (MPEP 1206- Time for Filing Appeal Brief) without necessity of extension.*

REAL PARTY IN INTEREST

The assignment recorded at Reel 012484, Frame 0477 transferred ownership of the application to Hon Hai Precision Ind. Co., Ltd.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences that will be affected by the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-3 and 7-14 comprise all currently pending claims, and all these claims stand rejected. Claims 4-6 have been canceled. Claims 1 and 11 are independent claims. The rejection of claims 1-3 and 7-14 is appealed herein.

STATUS OF AMENDMENTS

An amendment filed on Oct. 20, 2003 after a final rejection dated Jul. 30, 2003 and an Advisory Action mailed Oct. 14, 2003 would be entered for purposes of Appeal, according to Advisory Action mailed Oct. 30, 2003.

SUMMARY OF THE INVENTION

The invention comprises a DWDM thin film filter comprising a substrate (11) and a film stack (12). The film stack (12) comprises a plurality of cavities (13). Each cavity comprises a first group of mirror layers (21), a second group of mirror layers (22), and a spacer layer (23) (see specification page 4, lines 9-11, and FIGS. 1 & 2). Each group of mirror layers (21, 22) comprises a plurality of high refractive index thin films (31) and low refractive index thin films (32) alternately deposited one on another (see specification page 4, lines 19-22, and FIG. 2). The

material of the high refractive index films (31) is a composition of indium-tin oxide (see specification page 5, lines 9-10).

The feature of the invention is to provide a thin film stack of a DWDM thin film filter not only having relatively few layers of film and less internal stress but also being relatively simple and inexpensive to manufacture. Additionally, the DWDM thin film filter is relatively resistant to failure during manufacture and in use (see specification page 2, lines 16-17).

ISSUES PRESENTED FOR REVIEW

The grounds of rejection given in the final Office action dated Jul. 30, 2003 were that the subject matter of claims 1, 7 and 11 was unpatentable under 35 U.S.C. 103(a) over Pelekhaty (US Pat. No. 6,215,592) in view of Mitsui (US Pat. No. 6,042,752); and that the subject matter of claims 2-3, 8-10 and 12-14 was unpatentable under 35 U.S.C. 103(a) over Pelekhaty in view of Mitsui as applied to claims 1 and 11, and further in view of Adair (US Pat. No. 6,490,381).

The sole issue presented for review is whether the subject matter of claims 1, 7 and 11 is patentable under 35 U.S.C. 103(a) over Pelekhaty in view of Mitsui.

GROUPING OF CLAIMS

The pending claims 1-3 and 7-14 do NOT stand or fall together. The corresponding reasons are stated in the following Argument For Allowance.

ARGUMENT FOR ALLOWANCE

The Rejection

The position taken by Examiner in the final Office action is understood, in summary, to be as follows. Examiner states that Pelekhaty teaches a thin film filter for DWDM comprising a glass substrate (200), a film stack comprising a plurality of cavities (178, 182, 180; Fig. 11) wherein each cavity comprises a first mirror layer (194 for cavity 180) and a second mirror layer (176 for cavity 180) on the glass substrate comprising low refractive index thin films (68) and high refractive index thin films (66), and the number of layers in a film stack with five cavities would be about 160. Examiner further states that Mitsui teaches the use of tin oxide including indium as a thin film light transmissive layer (col. 2, lines 27-29), and the claimed composition (col. 2, lines 38-40) has an indium content being between 0.1 and 30 percent and a gallium content between 0.1-30 percent. Thus Examiner asserts that the combination of Pelekhaty and Mitsui renders the invention obvious.

Reasons for Claims Being Separately Patentable

Claims 1-3 and 8-10 have the features of "both of the first mirror layer and the second mirror layer including low refractive index thin films and high refractive index thin films, and wherein each of the high refractive index thin films comprises a composition of indium-tin oxide having [a] high refractive index such that a substantially different refractive index between the low refractive index thin films and the high refractive index thin films is formed," which are not disclosed in either Pelekhaty or Mitsui, and are not defined in any other claims of the present application except for claim 7.

Claims 7 has the feature of "a range of the composition of indium-tin oxide is from 20% indium oxide plus 80% tin oxide to 17% indium oxide plus 83% tin oxide," which is not disclosed in either Pelekhaty or Mitsui, and is not defined in any other claims of the present application.

Claims 11-14 define "each of the high refractive index thin films comprises a composition of indium-tin oxide having a refractive index of about 2.1, numbers of the layers in the five cavities being about 160." This feature is not disclosed in either Pelekhaty or Mitsui, and is not defined in any other claims of the present application either.

Therefore, the pending claims do not stand or fall together.

The Patentability of the Claimed Subject Matter

Applicant respectfully, but vigorously, disagrees with the rejection of claims 1-3 and 7-14 contained in the final Office action. Specifically, the position of Applicant is as follows:

References Being In Non-Analogous Fields for Claim 1

Regarding claim 1, firstly, the Pelekhaty and the Mitsui references belong to two separate specialized fields of endeavor not related to each other. The Pelekhaty reference relates to an optical filter, and the Mitsui reference relates to a transparent conductive film with tin oxide. Mitsui teaches the transparent conductive film being used in a transparent surface heater, in an antistatic article, in an antistatic wafer-transporting chuck for producing semiconductors (col. 7, lines 53-60), or as a transparent electrode (col. 1, lines 14-21). An electric current is necessary to operate the transparent conductive film, and/or its electrical conductivity is otherwise utilized. Visible light can of course transmit through the

transparent conductive film; however, there is no mention or suggestion of manipulation of light with a particular wavelength for the purposes of filtering and thereby communicating information. In other words, **the transparent conductive film of Mitsui belongs to the domain of electrically conductive layers. The optical filter of Pelekhaty is for filtering light with a particular wavelength, and belongs to the domain of optical transmission communications.** Applicant strenuously traverses Examiner's assertions in the final Office action (pp.6-7) that "both [Pelekhaty and Mitsui] use thin film optical properties to filter light ... [and that] ...Mitsui uses the indium tin oxide layer to filter ... visible light." Rather, Mitsui simply provides a tin oxide type *transparent* conductive film (col. 2, lines 27-29). There is no teaching or suggestion in Mitsui of filtering, only that the conductive film is transparent. Therefore, the two cited references respectively belong to two **different and non-analogous arts.**

If further argument is needed, even assuming that the transparent conductive film of Mitsui could be used to filter visible light, it is well known that the wavelength of visible light is between 400 nm and 700 nm. Compare this with the optical filter of Pelekhaty, which is for filtering a light with a particular wavelength between 1542 nm and 1561 nm (Fig. 5) for DWDM according to the International Telecommunication Union channel grid. It would not be proper to combine these two disparate references, since they are from ***unconnected fields***.

Lack of Teaching Combination of References for Claim 1

Secondly, there is no suggestion or motivation in either of the Pelekhaty or the Mitsui references that they be combined with each other. The single thin film of Mitsui is directed to providing low electrical resistance, not to providing a high refractive index for use in an optical film stack such as in Pelekhaty.

In addition, because Mitsui concentrates on low resistance, it by implication teaches against the use of many thin films in a stack which would cumulatively increase resistance. Furthermore, even assuming that Mitsui could be construed to suggest using multiple thin films in a stack, Mitsui is silent as to how using its films could achieve a desired optical reflectivity. That is, Mitsui is silent about how its thin film could be used in relation to another thin film having a low refractive index to produce a substantially different refractive index therebetween. *There is no suggestion that indium-tin oxide used to conduct current could be used in an optical filter for DWDM in accordance with the International Telecommunication Union channel grid.* Mitsui merely teaches a film transparent to visible light (having a wavelength between 400 nm and 700 nm), and does not contemplate transmission of light at communications wavelengths such as between 1542 nm and 1561 nm as found in Pelekhaty.

Novel Structure Resulting In Unexpected And Surprising Advantages for Claim 1

Thirdly, Mitsui teaches the tin oxide type transparent conductive film having low resistance and high scratch resistance (col. 2, lines 27-29). However, the filter of the present invention has high refractive index thin films with indium-tin oxide. Such structure enables the filter to have a reduced number of layers and help eliminate internal stress. **There is no hint, suggestion or teaching in either of the cited references that a film with indium-tin oxide used in a filter can reduce the number of layers and help eliminate internal stress of the filter.** In other words, the ***novel*** structure of the optical filter of the present invention produces ***unexpected and surprising advantages***, and therefore should be considered as unobvious.

In the final Office action (p.7), Examiner essentially states that the limitation of the decreased internal stress is not present in the language of claim 1, and that no evidence has been supplied to suggest unexpected results. Applicant

respectfully disagrees because **claim 1 has clearly defined the structure of the filter. The structure and the operational principles of the optical filter are clearly and distinctly disclosed in the specification (see page 5, lines 9-18) to support the claims.** Page 3, lines 13-24 and page 6, lines 4-12 of the specification together with FIGS. 3-6 of the drawings provide empirical evidence of the advantages of the filter. As explained, the structure of the filter enables it to have fewer layers and be more resistant to internal stress compared with a conventional optical filter. The resultant reduced overall size, reliability and high manufacturing yield would be readily apparent to and appreciated by one of ordinary skill in the art.

In summary, the filter defined in claim 1 is patentable over the prior art. Therefore claim 1 should be in a condition for allowance.

Reference Not Teaching Or Suggesting The Claimed Limitation for Claim 7

Regarding claim 7, since claim 7 depends from claim 1, claim 7 should likewise be patentable. If further argument is needed, the compound defined in claim 7 is a mixture of indium oxide and tin oxide. However, Mitsui teaches the compound having an indium content being between 0.1 and 30 percent and a gallium content of 0.1-30 percent. A person of ordinary skill in the art cannot derive the compound of the present invention from the compound of Mitsui. The broad range provided by Mitsui is for the purpose of providing a thin film having low electrical resistance. However, there is no suggestion in Mitsui that a narrower range within this broad range could yield desired high refractive index optical properties. Further, as detailed above in relation to claim 1, the present invention's range of values yields new unexpected results: namely, a thin film filter which has a reduced number of layers of film and which is more resistant to internal stress.

In summary, the filter defined in claim 7 is patentable over the prior art. Therefore claim 7 should be in a condition for allowance.

References Being In Non-Analogous Fields for Claim 11

Regarding claim 11, firstly, the two cited references respectively belong to two **different and non-analogous fields and cannot properly be combined**, as asserted above with respect to claim 1.

References Not Teaching Or Suggesting The Combination Claimed for Claim 11

Secondly, **neither of the cited references contains a hint, suggestion or teaching that a film with indium-tin oxide used in a filter can reduce the number of layers and eliminate internal stress of the filter**, as asserted above with respect to claim 1.

Claimed Features Being Not Mere Duplications Of Reference Material for Claim 11

Thirdly, the cited references fail to disclose or suggest the number of cavities (5) and the number of layers (about 160) claimed. In the final Office action (p.4) Examiner states the limitation is an obvious duplication of the known parts of the Pelekhaty reference. Applicant acknowledges that as a general principle, mere duplication of prior art features may not be patentable. However, applicant asserts that the claimed feature of the invention is ***not a "mere" duplication***. A person of ordinary skill in the art knows that the number of cavities and layers in an optical filter determines the optical performance of the optical filter. The more layers the optical filter has, the narrower the pass bandwidth is. The more layers the optical filter has, the more attenuation is produced. Such person is required to determine a particular number of layers in order to optimize the optical performance of the

optical filter. That is, for the purposes of the present invention, a narrower pass bandwidth and less attenuation is desired. Thus, **the number of the layers of the claimed optical filter is not a mere duplication. Rather, the number of the layers (about 160) has been logically configured using the principles of the present invention to be *less* than that of comparable prior art (180).** Further, the reduced number of the layers provides the results of reduced overall thickness and reduced internal stress, neither of which is contemplated by either of the cited references. Therefore, the number of cavities (5) and the number of layers (about 160) cannot be considered to be an obvious derivation from the cited references by simple duplication.

Novel Structure Resulting In Unexpected And Surprising Advantages for Claim 11

Fourthly, the filter defined in claim 11 produces ***unexpected and surprising*** advantages, as asserted above with respect to claim 1.

In summary, the filter defined in claim 11 is patentable over the prior art. Therefore claim 11 should be in a condition for allowance.

Since dependent claims 2-3, 8-10 and 12-14 directly or indirectly depend from independent claims 1 and 11 respectively, they are also believed to be patentable.

CONCLUSION

In conclusion, the non-obviousness of the instant invention is reasoned as follows:

(1) The primary two references, Mitsui and Pelekhaty, belong to two different fields.

(2) There is no suggestion or motivation to combine these two references. When a rejection depends on a combination of prior art references, the PTO must show that there is some teaching suggestion, or motivation to combine the references. In re Geiger, 815 F 2.2d 686, 688, 2USPQ2d 1276, 1278 (Fed. Cir. 1987). A conclusion of obviousness may be based on a combination of references only where there is some reason, suggestion, or motivation to combine those references to arrive at the claimed invention. In re Dembiczak, 175 F.3d at 999, 50 USPQ2d (BNA) at 1617 (Fed. Cir. 1999).

(3) None of the cited references address **the problem**, i.e., *elimination of internal film stress*, and needless to say **the solution**, i.e., *reduction of the layers by means of usage of indium-tin oxide.* The mere fact the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 972 F.2d 1260, 1266, n.14, 23 USPQ 2d 1780, 1783-84 n.14 (Fed. Cir. 1992). Without such a motivation, no obviousness could be concluded in the instant application.

(4) The Examiner believes that disregarding/ignoring the fact of "decreased internal stress" is proper because (I) such a functional limitation is not shown in the claims and (II) no evidence has been supplied to suggest unexpected results (office action, page 7). As argued earlier in page 7 of this amendment, even though no functional limitation is fully cited in the claims, the structure defined in claims inherently owns this advantage theoretically and practically. Also referring to the specification, page 2, paragraph [0004], lines 6-11, paragraphs [0005], [0006] and [0007], it evidentially shows the invention performs and should perform elimination of internal stress, otherwise listing such disadvantages of the prior art makes no sense. Accordingly, the Examiner rejection's basis is improper. Moreover, as mentioned in (3) above, nowhere in the cited references

disclosing or suggesting "desirability of elimination of internal stress" refers to no motivation for combination and concludes non-obviousness.

(5) " One way for a patent applicant to rebut a prima facie case of obviousness is to make a showing of 'unexpected results', i.e., to show that the claimed invention inhibits some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected." In re Soni, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995). The instant invention uses the less layers for elimination of internal film stress while even achieving the superior isolation property, thus owing the unexpected results/advantage (referring to paragraphs [0004] and [0022]).

Accordingly, Applicant's claims 1-3 and 7-14 are directed to subject matter patentable over the Pelekhaty and the Mitsui references.

For the above reasons, Applicant respectfully requests that Examiner's rejection of claims 1-3 and 7-14 be withdrawn, and that these claims now pass to issue.

Respectfully submitted,
Charles Leu et al

By _____
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APPENDIX

1. A thin film filter for dense wavelength division multiplexing, the thin film filter comprising:

a glass substrate; and

a film stack mounted on the glass substrate, the film stack comprising a plurality of cavities; wherein

each cavity comprises a first mirror layer, a second mirror layer, and a spacer layer arranged therebetween, both of the first mirror layer and the second mirror layer including low refractive index thin films and high refractive index thin films, and wherein each of the high refractive index thin films comprises a composition of indium-tin oxide having high refractive index such that a substantially different refractive index between the low refractive index thin films and the high refractive index thin films is formed.

2. The thin film filter as described in claim 1, wherein the film filter further comprises a coupling film, and the coupling film adjoins an adjacent cavity of the plurality of cavities.

3. The thin film filter as described in claim 2, wherein the coupling film is made of a material having a relative low refractive index.

7. The thin film filter as described in claim 1, wherein a range of the composition of indium-tin oxide is from 20% indium oxide plus 80% tin oxide to 17% indium oxide plus 83% tin oxide.

8. The thin film filter as described in claim 1, wherein the low refractive index thin films comprise silicon dioxide (SiO_2) or aluminum oxide (Al_2O_3).

9. The thin film filter as described in claim 8, wherein the low refractive index thin films and the high refractive index thin films are alternately deposited one on another.

10. The thin film filter as described in claim 9, wherein each of the low refractive index thin films and each of the high refractive index thin films has an optical thickness equal to one-quarter of a central wavelength of a pass bandwidth of the thin film filter.

11. A thin film filter for dense wavelength division multiplexing, the thin film filter comprising:

a glass substrate; and

a film stack mounted on the glass substrate, the film stack comprising five cavities, each cavity having a plurality of layer, and each layer comprising low refractive index thin films and high refractive index thin films; wherein

each of the high refractive index thin films comprises a composition of indium-tin oxide having a refractive index of about 2.1, and numbers of layers in five cavities are about 160.

12. The thin film filter as described in claim 11, wherein the film filter further comprises a coupling film, and the coupling film adjoins an adjacent cavity.

13. The thin film filter as described in claim 12, wherein coupling film is made of a material having a relative low refractive index.

14. The thin film filter as described in claim 13, wherein the low refractive index thin films comprise silicon dioxide (SiO_2) or aluminum oxide (Al_2O_3).